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November 15, 2013

Dania Zinner
USEPA; Region 8
1595 Wynkoop Street (8EPR-SR)
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Dear Ms. Zinner:

EPA CONTRACT NUMBER EP-W-10-033
TASK ORDER NUMBER 3019
QA SUPPORT FOR THE LIBBY ASBESTOS SITE

Enclosed please find the Summary Asbestos On-site Audit Report for the on-site audit performed on May 22, 2013 at EMSL Analytical, Inc. in New York, New York. This report and the accompanying checklist are deliverables under Task 5 of the subject Task Order.

If you have any questions, please feel free to contact me.

Sincerely,

Timothy L. Vonnahme
Audit Group Manager, QATS Program
CB&I Federal Services, LLC
Phone: (702) 895-8729
E-Mail Address: timothy.vonnahme@cbifederalservices.com

cc: Administrative Contracting Officer (letter only)
Audit Group Files



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The QATS Program's Quality Management System is certified to the ISO 9001:2008 International Standard

**REPORT
FOR
TASK ORDER NUMBER 2019
QUALITY ASSURANCE SUPPORT FOR THE LIBBY ASBESTOS SITE
SUMMARY ASBESTOS ON-SITE AUDIT REPORT**

EMSL Analytical, Inc. (New York, NY)

Prepared by:

**The Data Auditing Group
Quality Assurance Technical Support Program
CB&I Federal Services, LLC
2700 Chandler Avenue
Las Vegas, Nevada 89120**

November 14, 2013

QATS Contract Number: EP-W-10-033

Prepared for:

**Dania Zinner
Task Order Manager**

**Region 8
U.S. Environmental Protection Agency
1595 Wynkoop Street
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LABORATORY INFORMATION AND AUDIT SCOPE

This report summarizes the results of an asbestos laboratory on-site audit of the EMSL Analytical, Inc. (EMSL) in New York, New York conducted on May 22, 2013. This audit was conducted in support of the United States Environmental Protection Agency (EPA) Region 8 Libby Superfund Site activities. The purpose of the audit was to evaluate the laboratory's ability to process samples and data in accordance with the EPA-provided Libby-specific guidance documents. Since this was the first EPA directed on-site audit of this laboratory, CB&I Federal Services, LLC Quality Assurance Technical Support (QATS) staff participation in the on-site audit and subsequent preparation of this report was performed under Task 5, Task Order (TO) 2019, QATS Contract EP-W-10-033.

Detailed information regarding the subject laboratory is as follows:

Date of On-site: **May 22, 2013**

Laboratory: **EMSL Analytical, Inc.
307 West 38th Street
New York, NY 10018
(212) 290-0051**

Special Projects Manager: **Robyn Denton**

Audit Team

US EPA: **Dania Zinner, Remedial Project Manager, Region 8**

CB&I QATS: **Michael Lenkauskas, CQA, Senior Auditor**

The Audit Team, comprised of USEPA Region 8 and CB&I Federal Services, LLC QATS personnel, performed the technical and evidentiary aspects of the on-site audit. The technical part of the audit involved an evaluation of the Contractor's facilities, personnel, and capabilities to process samples and data as described in the Libby-specific guidance documents. Processes evaluated included sample receipt, sample storage, sample tracking, sample preparation, sample analysis, data review, and data package assembly. Laboratory instrumentation and equipment were inspected for proper maintenance and calibration, and laboratory personnel were interviewed to determine proficiency in their assigned responsibilities. Specific instrumentation and areas inspected included sample receiving, Polarized Light Microscopy (PLM), Transmission Electron Microscopy (TEM), and the laboratory's capability to provide the required hardcopy and electronic deliverables.

The evidentiary part of the evaluation involved an assessment of laboratory documentation for accuracy, completeness, and defensibility. The Laboratory Quality Assurance Manual (QAM) and standard operating procedures (SOPs) were assessed for availability and accuracy to observed procedures, and instrument calibration, and maintenance logbooks were reviewed for completeness, traceability, and accuracy.

During the course of the audit, the Libby-Specific Asbestos Laboratory On-site Audit Checklist was completed by the Audit Team. The checklist is provided as an attachment to this report (EPA only).

EXECUTIVE SUMMARY

An asbestos on-site audit of EMSL Analytical, Inc. in New York, New York was performed on May 22, 2013 in support of EPA Region 8 Libby Superfund Site activities. The Audit Team evaluated the laboratory's facilities, equipment, personnel, and documentation as related to their capability to analyze samples from the Libby Superfund Site for asbestos in accordance with Libby-specific requirements. Specific laboratory areas and processes evaluated included sample receipt, sample storage, sample tracking, direct and indirect sample preparation for TEM analysis, analysis by PLM, analysis by TEM, data management, and Quality Control/Quality Assurance (QA/QC).

The on-site audit identified seven (7) deficiencies, which are summarized below by laboratory area:

Sample Receipt, Storage, Log-in, and Chain-of-Custody (COC) – One deficiency was assessed for lack of a HEPA hood in the sample receiving area for use in opening and inspecting sample shipment containers.

Indirect and Direct Preparation of Air Filter and Dust Samples – Four equipment-related deficiencies were assessed for lack of a dedicated drying oven for drying Libby ambient air filters, lack of a second plasma asher, failure to assign unique identification numbers to two analytical balances, and failure to have in stock disposable funnels required for the indirect preparation of samples for TEM analysis.

Transmission Electron Microscopy (TEM) Analysis – One deficiency was assessed for failure to generate instrument-specific Libby Amphibole (LA) reference spectra on scope 3-2.

Polarized Light Microscopy (PLM) Analysis – One deficiency was assessed for not having all of the reference weights necessary to calibrate balances prior to weighing samples for the project-specific PLM-GRAV procedure.

Corrective Action – No corrective actions of previous deficiencies is listed because this was the first on-site audit of the EMSL-NY laboratory.

With the exception of the deficiencies noted above, the on-site evaluation revealed EMSL Analytical Inc. in New York, NY to have sufficient facilities, equipment, and staff to effectively analyze samples in accordance with Libby-specific protocols. All staff and management were cooperative, readily answered all questions asked by the Audit Team, and appeared to be responsive to the identified deficiencies.

AUDIT FINDINGS

Sample Receipt, Storage, Log-in, and Chain-of-Custody (COC)

The sample receipt area located in the reception area was clean and well organized. The Audit Team observed the inspection and processing of a set of air samples by the acting Sample Custodian. The acting Sample Custodian demonstrated a clear understanding of the process for sample inspection, processing, and distribution. One deficiency concerning contamination control was identified:

1. A HEPA hood for use in opening sample shipment containers and inspecting the contents for damage or loose debris is not available in the sample receiving area. The requirement to minimize potential contamination from samples to the laboratory environment is described in Section 5.3.2 of the laboratory's QAM. (Audit Checklist No. 4.2.3)

Recommended Corrective Action – In order to minimize the potential for laboratory contamination and/or personnel exposure, all sample shipment containers should be opened within a HEPA hood and inspected for loose debris prior to processing.

Indirect and Direct Preparation of Air Filter and Dust Samples

The TEM preparation area was clean and organized, with adequate equipment and instrumentation for preparing samples for TEM analysis using the direct and indirect preparation techniques. The laboratory does not currently have all of the equipment needed to prepare water, tree bark, or duff samples. As part of the evaluation, the preparation technician demonstrated the techniques used to prepare samples using both the direct and indirect preparation techniques. The technician demonstrated proficiency and a clear understanding of the processes for the preparation of asbestos samples. Four equipment-related deficiencies were identified:

2. The laboratory does not have a dedicated drying oven to dry Libby ambient air filters or the secondary filters generated from indirect preparations. The requirement to have either a desiccator or low temperature drying oven available to dry secondary filters is described in Section 3.0 of the Libby-specific SOP for the Indirect Preparation of Air and Dust Samples for TEM Analysis (EPA-Libby-08), and the requirement to dry ambient air sample filters is described in laboratory modification LB-000055B. (Audit Checklist Nos. 6.4.2 and 8.4.2.1)

Recommended Corrective Action – Obtain a low temperature drying oven for drying Libby ambient air filters and secondary filters generated from indirect preparation.

3. The laboratory only has one plasma asher, which is used continuously to etch MCE filters for TEM analysis. A second plasma asher for the ashing of loose debris and filters for any required indirect preparations is not available. The requirement for ashing samples that exhibit uneven loading, are overloaded, or have loose debris is described in the Libby-specific SOP for the Indirect Preparation of Air and Dust Samples for TEM Analysis (EPA-Libby-08). (Audit Checklist No. 6.8.3.2.2)

Recommended Corrective Action – Acquire an additional plasma asher for the ashing of filter samples and loose debris for samples requiring indirect preparation.

4. Two analytical balances used for gravimetric determinations were observed to have the same identification number (Balance No. 4). Lack of unique identification numbers prevents direct traceability of each of these balances to their respective calibration logbooks. The requirement that a logbook be maintained for each piece of critical equipment in use at the laboratory to record all maintenance, repairs, and calibrations and that the equipment be uniquely identified is described in Section 5.5.1 of the laboratory's QAM. (Audit Checklist Nos. 6.4.4.1 and 6.15.1)

Recommended Corrective Action – To ensure unambiguous traceability to maintenance and calibration records of all critical equipment, assign a unique identifier to each piece of equipment.

5. The laboratory does not have the disposable funnels required for the indirect preparation of samples for TEM analysis in stock. The requirement to use disposable funnels for the indirect preparation of samples for TEM analysis is described in Sections 3.0 and 4.1.13 of the Libby-specific SOP for the Indirect Preparation of Air and Dust Samples for TEM Analysis (EPA-Libby-08). (Audit Checklist No. 6.4.7.1)

Recommended Corrective Action – Obtain disposable funnels for use in all indirect preparation procedures.

Transmission Electron Microscopy (TEM) Analysis

The area was found to be clean and well organized, and the TEM instruments used to support the project were well-maintained and calibrated at the specified frequencies. The TEM analyst interviewed demonstrated an understanding of the applicable techniques for identifying and recording structures as described in the applicable Libby-specific guidance documents. One deficiency related to the lack of reference spectra was identified:

6. Instrument-specific Libby Amphibole (LA) spectra have not been generated for Scope 3-2. Because LA is not a common form of asbestos, each laboratory is required to establish a reference library of instrument-specific LA spectra. The requirement for each laboratory, upon entry into the Libby program, to analyze multiple LA structures and establish a reference library of instrument-specific LA spectra is described in Section 4.2.2.2 of the Libby Site-wide Quality Assurance Reference Document. (Audit Checklist No. 7.6.2)

Recommended Corrective Action – For all TEM instruments used to analyze Libby samples, ensure that multiple LA structures have been analyzed, and reference libraries of instrument-specific LA spectra generated.

Polarized Light Microscopy (PLM) Analysis

The PLM area has multiple work stations, each equipped with a stereomicroscope, functional HEPA hood, polarized light microscope, refractive index (RI) liquids, and tools for manipulating samples; however, only one is currently dedicated to the Libby project. The area was clean and organized; the instrumentation well-maintained; and the quality of the documentation acceptable. The analyst interviewed demonstrated a clear understanding of PLM instrument maintenance and calibration and sample preparation, analysis, and documentation. One deficiency was identified:

7. The laboratory does not have all of the reference weights necessary to calibrate balances prior to weighing samples for the project-specific PLM-GRAV procedure. The requirement that balance calibrations be performed each day samples are analyzed with at least three weights in the range of 1 milligram to 50 grams is described in Section 12.0 of the PLM-Grav SOP (SRC-Libby-01, Rev 3). (Audit Checklist No. 8.4.4.2)

Recommended Corrective Action – Obtain all necessary reference weights to ensure that balances used to weigh samples for PLM-GRAV analyses are calibrated as required.

Data Management

The laboratory documentation of sample receipt, login, sample preparation, equipment calibration, and analytical observations was complete, well organized, and accurate. Note that the data review and electronic data deliverable (EDD) generation is performed at the EMSL-NJ corporate facility and was evaluated during the on-site audit performed at EMSL-NJ on June 26-27, 2012. No deficiencies concerning data management were identified.

Quality Control and Quality Assurance (QA/QC)

The Audit Team interviewed the Quality Assurance Officer (QAO), reviewed the laboratory's QAM, and performed a cursory review of recent monthly quality control reports, laboratory air monitoring results, non-conformance reports, laboratory certifications, internal audit reports, and the training files of interviewed laboratory personnel. The QAO demonstrated an understanding of and commitment to the laboratory's current quality system. No deficiencies concerning QA/QC were identified.

CONCLUSIONS

An asbestos laboratory on-site audit of EMSL Analytical, Inc. in New York, New York was performed on May 22, 2013 in support of EPA Region 8 Libby Superfund Site activities. The audit involved an assessment of the laboratory's facility, personnel, instrumentation, and an evaluation of the laboratory areas and processes for sample receipt, sample storage, sample tracking, sample preparation for TEM analysis, analysis by PLM, and QA/QC. The on-site audit identified the following seven deficiencies:

- A HEPA hood for use in opening sample shipment containers and inspecting the contents for damage or loose debris is not available in the sample receiving area.
- The laboratory does not have a dedicated drying oven to dry Libby ambient air filters or the secondary filters generated from indirect preparations.
- The laboratory only has one plasma asher, which is used continuously to etch MCE filters for TEM analysis. A second plasma asher is needed for the ashing of loose debris and filters for any required indirect preparations.
- Two analytical balances used for PLM-GRAV were assigned the same identification number (Balance No. 4).
- The laboratory does not have the disposable funnels required for the indirect preparation of samples for TEM analysis in stock.
- Instrument-specific LA reference spectra have not been generated for Scope 3-2.
- The laboratory does not have all of the reference weights necessary to calibrate balances prior to weighing samples for the project-specific PLM-GRAV procedure.

With the exception of these seven deficiencies, the on-site evaluation revealed the laboratory to have sufficient facilities, equipment, and staff to effectively analyze samples in accordance with the specified methodologies and Libby-specific protocol. All staff and management were cooperative, readily answered all questions asked by the Audit Team, and appeared to be responsive to the identified deficiencies.

ATTACHMENT

Libby-Specific Asbestos Laboratory On-site Audit Checklist (EPA Only)

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013Laboratory: EMSL Analytical, Inc.Address: 307 West 38th StreetNew York, NY 10018Telephone: (212) 290-0051Laboratory Personnel Contacted

Name	Title
James Hall	Laboratory Manager
Jose Arriaga	QA/QC Manager
Roberto Trotman	Sample Custodian
Gerald Iannuzzi	TEM Analyst
Jessica Cox	PLM Analyst
Derrick Young	TEM Analyst
Alicia Folger	TEM Sample Preparation

Evaluation Team

Name	Title
Dania Zinner	USEPA Region 8, Remedial Project Manager
Michael Lenkauskas, CQA	CB&I Federal Services, LLC (QATS), Senior Auditor

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013

1.0 LABORATORY STATUS & CAPABILITIES		Yes	No	Comments
1.1 Which of the following capabilities does the laboratory possess:				
1.1.1	Phase Contrast Microscopy (PCM)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1.1.2	Polarized Light Microscopy (PLM)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1.1.3	Transmission Electron Microscopy (TEM)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1.1.4	Others (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Microbiology
1.2 Is the laboratory currently receiving samples from Libby Superfund Site Operable Units?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Only received inter-labs as part of the mentoring process.
If "YES," complete the following table:				
Operable Unit	Matrix/Method(s)	Project/Comments		

2.0 LABORATORY SECURITY		Yes	No	Comments
2.1 Are visitors required to sign in?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2.2 Are all entrances to the laboratory secured?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:				

3.0 PROJECT INITIATION/PROJECT MANAGEMENT		Yes	No	Comments
3.1 Are there designated project managers or a project management team to ensure samples received are properly processed?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	James Hall or Joe Arriaga
3.2 Are project-specific requirements and procedures communicated to laboratory staff:				
3.2.1	Project-specific SOPs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.2	Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.3	SAP Analytical Summaries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.4	Project-specific Electronic Data Deliverables (EDDs)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.5	Other (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Available in the eRoom where access will be provided to all applicable personnel.
Additional Comments:				

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013

4.0 SAMPLE RECEIPT, LOG-IN, STORAGE, & TRACKING		Yes	No	Comments
4.1 Is the sample receiving area adequate, clean, and orderly?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed				
Name	Title	Experience		
Roberto Trotman	Sample Custodian	2 Years		
4.2 Sample Receipt				
4.2.1 Is there a sample custodian and designated alternate responsible for sample receipt and log-in?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Roberto Trotman
4.2.2 Is the custodian or alternate available to receive and log-in samples at any time delivery services are operating?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Laboratory is open 24 hours a days, seven days a week.
4.2.3 Are sample shipping containers opened in a HEPA hood (as necessary) to both minimize personal exposure and safeguard against laboratory contamination?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 1 in the Audit Report.
4.2.4 Does the sample custodian verify and record the following when inspecting shipments and reviewing documentation:				
4.2.4.1 Presence and condition of custody seals?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.4.2 Presence or absence of Chain-of-Custody (COC) records?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.4.3 Presence or absence of air bill sticker(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.4.4 Sample condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.4.5 Presence of packaging or packing material which could compromise samples (i.e., vermiculite & polystyrene)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.4.6 Problems/discrepancies between samples, documentation, client requests, etc.?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.4.7 Bulk and air samples received separately?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4.2.5 Are COC records signed and dated at the time of sample receipt?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.2.6 Is a system in place to ensure laboratory personnel are made aware of project specific requirements?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.2.7 Is a system in place to contact the client in case of absent documentation, or discrepancies between COCs, client requests, etc.?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Communication to go through special projects manager.
4.2.8 Are subsequent resolutions to problems and discrepancies documented?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Communication log and e-mails.
4.3 Sample Identification				
4.3.1 Are sample receipt identification logbooks, or a LIMS, used to log-in samples and assign unique laboratory identification numbers?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	LIMS
4.3.1.1 Does the logbook or logging system serve as a direct cross-reference between laboratory ID numbers and client ID numbers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Additional Comments:				

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013

4.0 SAMPLE RECEIPT, LOG-IN, STORAGE, & TRACKING	Yes	No	Comments
4.4 Sample Storage			
4.4.1 Are storage facilities sufficient?	NA	NA	Samples are not stored at this facility, but shipped to the Cinnaminson, NJ facility.
4.4.2 Is the sample storage area secured to prevent entry of unauthorized personnel?	NA	NA	
4.4.3 Is a logbook or other means used to record sample locations?	NA	NA	
4.4.4 Are samples easy to locate from logbook references?	NA	NA	
4.5 Sample Tracking			
4.5.1 Is a system in place to keep track of samples entering and leaving the storage, sample preparation, and analysis areas?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.5.2 Are the retention and/or disposal of unused portions of samples and prepared samples documented?	NA	NA	Samples are not stored at this facility, but shipped to the Cinnaminson, NJ facility.
4.5.2.1 Are project-specific retention and/or disposal requirements communicated and followed?	NA	NA	
4.6 Standard Operating Procedures (SOPs)			
4.6.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All SOPs are available on the laboratory network.
Document Title	Control No.	Description	
QA Manual	Rev. 16	Section 5.4.7.1.1 of Module A	
4.7 Document Control:	Yes	No	Comments
4.7.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Document Title	Description/Comments		
Additional Comments:			

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013

5.0 PHASE CONTRAST MICROSCOPY (PCM)		Yes	No	Comments
5.1 Does the laboratory perform PCM analyses on samples received from the Libby Superfund site? <i>If answered "No" precede to Section 6.0 of the checklist.</i>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5.2 Is the PCM area adequate, clean, and orderly?		<input type="checkbox"/>	<input type="checkbox"/>	
5.3 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?		<input type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed				
Name		Title		Experience
5.4 Methods and Guidance Documents		Yes	No	Comments
5.4.1 Are the applicable guidance documents available for reference:				
5.4.1.1 NIOSH Method 7400 (Issue 2), 1994?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.1.2 Other (list)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2 Are project-specific requirements communicated to laboratory personnel and available for reference:				
5.4.2.1 Laboratory Modification LB-000015A?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.2 SOP EPA-Libby-08?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.3 SAP Analytical Summaries?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.4 Project-specific Electronic Data Deliverables (EDDs)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.5 Other (list)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5 Equipment				
5.5.1 Ventilation Hoods:				
5.5.1.1 Checked routinely and recorded in a permanent logbook?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2 Are the microscopes used to analyze samples equipped with the following:				
5.5.2.1 Positive phase contrast, with green or blue filter?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.2 Adjustable field iris?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.3 Eyepiece (8 to 10X)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.4 Phase magnification (40 to 45X)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.5 Walton-Beckett Graticule?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.6 Stage micrometer with 0.01 mm subdivisions?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.3 Are microscope and phase ring alignment checks conducted daily?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.4 Is resolution periodically checked using an HSE/NPL slide?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.5 Are maintenance and calibration activities recorded in microscope-specific logbooks?		<input type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:				

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013

5.0 PHASE CONTRAST MICROSCOPY (PCM)		Yes	No	Comments
5.6 Sample Preparation				
5.6.1	Are filters prepared as described in the applicable method(s)?	<input type="checkbox"/>	<input type="checkbox"/>	
5.6.2	Are filters visibly overloaded (>25%) or contain loose debris prepared indirectly as described in SOP EPA-Libby-08?	<input type="checkbox"/>	<input type="checkbox"/>	
5.7 Sample Analysis				
5.7.1	Are the appropriate counting rules used (A or B)?	<input type="checkbox"/>	<input type="checkbox"/>	
5.7.2	How are the fields and fibers tracked and recorded? _____			
5.8 Quality Control				
5.8.1	Is each analyst provided a minimum of one reference slide per work day?	<input type="checkbox"/>	<input type="checkbox"/>	
5.8.2	Are recounts analyzed at a frequency of 1 per 10 samples analyzed?	<input type="checkbox"/>	<input type="checkbox"/>	
5.8.2.1	For count pairs not within acceptance limits are associated samples recounted?	<input type="checkbox"/>	<input type="checkbox"/>	
5.9 Standard Operating Procedures (SOPs)				
5.9.1	Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?	<input type="checkbox"/>	<input type="checkbox"/>	
Document Title		Control No.		Description
5.10 Document Control		Yes	No	Comments
5.10.1	Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?	<input type="checkbox"/>	<input type="checkbox"/>	
Document Title		Description/Comments		
Additional Comments:				

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 05/22/2013

6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.1 Are the grid preparation areas adequate, clean, and orderly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.2 Are bulk samples prepared in an area separate from that used to prepare air and dust samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.3 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed			
Name	Title		Experience
Gerald Iannuzzi	Analyst		7 Years
Alicia Folgar	Analyst		8 Years
6.4 Equipment & Supplies	Yes	No	Comments
6.4.1 Ventilation Hoods:			
6.4.1.1 Checked routinely and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.4.2 Drying oven:			
6.4.2.1 Checked routinely and recorded in a permanent logbook?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 2 in the Audit Report.
<i>Note: Desiccator is an option for indirect preparation.</i>			
6.4.3 Muffle furnace:			
6.4.3.1 Checked routinely and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.4.4 Analytical balances:			
6.4.4.1 Checked routinely and recorded in a permanent logbook?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 4 in the Audit Report.
6.4.4.2 Calibrated within the last 12 months by a certified technician?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.4.5 Plasma Asher:			
6.4.5.1 Calibrated at least quarterly and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<i>Refer to Request for Modification LB-000085A</i>			
6.4.6 Sputter Coater (Vacuum evaporator):			
6.4.6.1 Checked routinely and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.4.7 Filtration Apparatus (for indirect preparation):			
6.4.7.1 Are disposable or glass funnels used (record catalogue #)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 5 in the Audit Report.
6.4.7.2 Has the Effective Filtration Area (EFA) been determined and recorded for each apparatus?	<input type="checkbox"/>	<input type="checkbox"/>	
6.4.8 TEM Grids:			
6.4.8.1 Is documentation for average grid opening determination available?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.5 Direct and Indirect Preparation Methodology			
6.5.1 What method(s) does the laboratory use to prepare air and dust samples for TEM analysis:			
6.5.1.1 40 CFR, Chapter 1, Part 763, Subpart E - AHERA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.1.2 ISO 10312:1195 E - Determination of Asbestos Fibers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.1.3 ASTM D 5755-09 - Micro vacuum Sampling and Indirect Analysis of Dust by TEM?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.1.4 Others (list)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EPA Method 100.2
6.5.2 Are project-specific requirements communicated to laboratory personnel and available for reference:			
6.5.2.1 Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.2.2 Project-specific SOPs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.2.3 SAP Analytical Summaries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.2.4 Other (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Available in the eRoom, where access will be provided to all applicable personnel.
6.6 Sample Inspection			
6.6.1 Are air filter cassettes carefully wet-wiped prior to being transferred to the clean preparation area for inspection?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.6.2 Are air filter samples which are visibly overloaded, exhibit uneven loading, or contain loose debris, prepared indirectly? <i>Refer to Laboratory Modifications LB-000016H & LB-000031G</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.6.3 Are all ambient air samples dried upon receipt at the on-site laboratory (i.e., EMSL-Libby) prior to preparation and analysis? <i>Refer to Laboratory Modification LB-000055A</i>	NA	NA	Have not begun to receive samples from Libby, MT.
6.7 Direct Preparation of MCE and Polycarbonate Filters			
6.7.1 Are MCE filters collapsed using either a Di-Methyl Formamide (DMF) or acetone atmosphere (AA) technique (describe technique)? <i>The use of an acetone vaporizer ("hot block") is not advised due to the formation of wind rows and tilted fibers.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Acetone
6.7.2 Is plasma etching performed on collapsed MCE filters?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.7.2.1 Is a 5 to 10% layer of the collapsed surface removed during etching?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10% is etched.
6.7.3 Are collapsed MCE filters and secured polycarbonate filters transferred to a vacuum evaporator for carbon coating?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.7.4 Are excised filter sections placed on the appropriately labeled TEM grids and cleared using a Jaffe Washer or an equivalent technique (describe)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cleared with Acetone.
6.7.5 Are samples checked for remaining filter residue after clearing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.7.5.1 If residue remains, is condensation washing or an equivalent technique used (describe technique)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Extend Acetone clearing.
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.8 Indirect Sample Preparation of Air and Dust Samples			
6.8.1 Are the applicable Libby guidance documents available for reference:			Have yet to receive samples requiring indirect preparation, and will review both the SOP and associated lab mod.
6.8.1.1 SOP EPA-Libby-08 – Indirect Preparation of Air and Dust Sample for TEM Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.8.2 Sample filtration:			
6.8.3 Are the applicable SAP Analytical Summaries reviewed to determine the whether or not filter samples must be ashed?	NA	NA	
6.8.3.1 Are cassettes examined for loose material?	NA	NA	
6.8.3.1.1 If loose material or uneven loading is not evident, is a portion of the air samples retained?	NA	NA	
6.8.3.1.2 If loose material is evident, is the loose material filtered along with the air filter?	NA	NA	
6.8.3.2 Ashing (if applicable):			Refer to Finding No.3 in the Audit Report.
6.8.3.2.1 Are filters covered with aluminum foil and placed in a plasma asher?	NA	NA	
6.8.3.2.2 Is the plasma asher operated at minimum power?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.8.3.2.3 Is 100% ashing confirmed by visual observation?	NA	NA	
6.8.3.3 Are air filters, loose material, dust, or ash, rinsed into a beaker and brought to a final volume of 100 mL with particle-free water?	NA	NA	
6.8.3.3.1 Adjusted to a pH of 3-4 with a 10% solution of glacial acetic acid?	NA	NA	
6.8.3.3.2 Sonicated for 3 minutes and allowed to settle for 2 minutes prior to filtering?	NA	NA	
6.8.3.4 Are the appropriate aliquots of filtrate passed through a <u>disposable</u> 25 mm filter assembly with a 0.2 µm MCE filter with a 5.0 µm MCE support pad?	NA	NA	
6.8.4 Are serial dilutions performed as necessary?	NA	NA	
6.8.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.9 Water Sample Preparation			
6.9.1 What method(s) does the laboratory use to prepare water samples for TEM analysis:			
6.9.1.1 EPA Method 100.2 - Determination of Asbestos Structures Over 10 µm in Length in Drinking Water?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.9.1.2 EPA Method 100.1 - Determination of Asbestos Fibers Drinking Water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.9.1.3 Others (describe)? _____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.9.2 Are samples received and filtered by the laboratory within 48 hours of collection?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.9.2.1 If not, are they stored in a refrigerator until filtered?	NA	NA	
6.9.3 Laboratory Modification LB-000020A:			
6.9.3.1 Do samples undergo treatment with ozone/UV light?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.9.3.2 Are samples hand-agitated and sonicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Equipment not available, would need to be treated and filtered in Libby, MT.
<i>Refer to Section 6.2 of EPA Method 100.1</i>			
6.9.4 Are the appropriate aliquots of the original sample poured through a 25 mm or 47 mm MCE filter (0.22 µm or smaller pore size) with an MCE filter (5 µm pore size) backing pad?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Note: No less than 1 mL must be used as an aliquot.			
6.9.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.10 OU3 Tree Bark Sample Preparation			
6.10.1 Are the applicable Libby guidance documents available for reference:			Although the SOP is available in the eRoom, the laboratory is currently ill-equipped to prepare tree bark samples for TEM analysis.
6.10.1.1 EPA-Libby-2012-12 – Sampling and Analysis of Tree Bark for Asbestos?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.10.2 Drying and Ashing:			
6.10.2.1 Are the diameter and thickness of the tree bark samples measured and recorded to an accuracy of ± 2 mm?	NA	NA	
6.10.2.2 Is the entire tree bark sample weighed and placed in an oven for drying?	NA	NA	
6.10.2.2.1 Dried at 80° C until the weight stabilizes, a minimum of 6 hours, and weighed?	NA	NA	
6.10.2.3 Is the bark sample then covered and placed in a muffle furnace at 450° C for 18 hours, or until all organic matter has been removed, and weighed?	NA	NA	
6.10.2.3.1 Is the furnace ramped from 0° F to 450° C?	NA	NA	
6.10.3 Acid Treatment:			
6.10.3.1 After adding approximately 1-2 mL of DI water, is 10-20 of concentrated HCL added until no further reaction is visible (approx. 3-5 minutes)?	NA	NA	
6.10.3.2 Are samples diluted, transferred to a 100 mL container (with lid) and brought to a final volume of 100 mL with fiber-free DI water?	NA	NA	
6.10.3.3 Are samples capped, inverted 5-6 times, and sonicated for 2 minutes in preparation for filtering?	NA	NA	
6.10.4 Filtration:			
6.10.4.1 Are 5-20 mLs of solution transferred to a second container and brought to a volume of 100 mL with fiber-free DI water?	NA	NA	
6.10.4.2 Are dilutions agitated (inverted 5-6 times) and filtered through a 47 mm MCE filter (0.45 μ m pore size)?	NA	NA	
6.10.4.2.1 Are additional dilutions prepared if the loading on the filter appears either too heavy (> 20%) or too light?	NA	NA	
6.10.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.11 OU3 Duff Sample Preparation			
6.11.1 Are the applicable Libby guidance documents available for reference:			Although the SOP is available in the eRoom, the laboratory is currently ill-equipped to prepare duff samples for TEM analysis.
6.11.1.1 EPA-Libby-2012-11 – Sampling and Analysis of Duff for Asbestos?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.11.2 Drying and Ashing:			
6.11.2.1 Are the appropriate number of aluminum trays weighed and tared?	NA	NA	
6.11.2.1.1 For tracking purposes, is each tray marked with a unique number?	NA	NA	
6.11.2.2 Are trays filled to approximately ¾, dried at 60° C until the weight stabilizes a minimum of 10 hours, and weighed?	NA	NA	
6.11.2.3 Are dried duff samples transferred to covered pans and placed in a muffle furnace at 450° C for 18 hours, or until all organic matter has been removed, and weighed?	NA	NA	
6.11.2.4 Are ashed samples transferred to Zip-lock bags and homogenized?	NA	NA	
6.11.2.4.1 If an individual sample was split between multiple trays, was it combined into one Zip-lock bag?	NA	NA	
6.11.3 Acid Treatment:			
6.11.3.1 After adding approximately 1-2 mL of DI water to 0.25 grams (measured to ± 0.01 g) of ashed sample, is 10-20 mL of concentrated HCL added until no further reaction is visible (approx. 3-5 minutes)?	NA	NA	
6.11.3.2 Are samples diluted, transferred to a 100 mL container (with lid) and brought to a final volume of 100 mL with fiber-free DI water?	NA	NA	
6.11.3.3 Are sample capped, inverted 5-6 times, and sonicated for 2 minutes in preparation for filtering?	NA	NA	
6.11.4 Filtration:			
6.11.4.1 Is 0.1 to 1.0 mL of solution transferred to a second container and brought to a volume of 100 mL with fiber-free DI water?	NA	NA	
6.11.4.2 Are dilutions agitated (inverted 5-6 times) and filtered through a 47 mm MCE filter (0.45 µm pore size)?	NA	NA	
6.11.4.2.1 Are additional dilutions prepared if the loading on the filter appears either too heavy (> 20%) or too light?	NA	NA	
6.11.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION		Yes	No	Comments
6.12 Grid Preparation/filtrate Storage				
6.12.1 For indirect preparations, are remaining filtrates filtered onto the appropriate filter(s) to be archived?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.12.2 Are all remaining filters and filter portions labeled prior to archiving?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.12.3 Are grids stored in marked grid storage boxes or other suitable containers and stored in a dust/fiber free environment?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.12.4 Is the location of grid preparation recorded in such a manner that they can be retrieved upon request in a timely manner?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.13 Quality Control Samples				
6.13.1 Are quality control samples prepared at the described frequency:				
6.13.1.1 Are laboratory blanks (LB) prepared at a frequency of 4% or with each preparation batch, whichever is more frequent?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.13.1.2 Are re-preparations prepared at a frequency of 1%?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.14 Standard Operating Procedures (SOPs)				
6.14.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	All SOPs are available on the laboratory network.
Document Title	Control No.	Description		
6.15 Document Control		Yes	No	Comments
6.15.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 4 in the Audit Report.
Document Title	Description/Comments			
Balance No. 4 Logbook	Balance calibration logbook			
Additional Comments:				

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7.0 TEM ANALYSIS		Yes	No	Comments
7.1 Are TEM areas adequate, clean, and orderly?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.2 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed				
Name	Title	Experience		
Derrick Young	TEM Analyst	7 Years		
7.3 Methods and Guidance Documents		Yes	No	Comments
7.3.1 What method(s) does the laboratory use to analyze samples TEM:				
7.3.1.1 40 CFR, Chapter 1, Part 763, Subpart E (AHERA)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.1.2 ISO 10312:1995 E - Determination of Asbestos Fibers?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.1.3 ASTM D 5755-09 - Microvacuum Sampling and Indirect Analysis of Dust by TEM?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.1.4 EPA Method 100.2 - Determination of Asbestos Structures Over 10 µm in Length in Drinking Water?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.1.5 Others (list)? _____		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7.3.2 Are project-specific requirements communicated to laboratory personnel and available for reference:				
7.3.2.1 Laboratory Modifications?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Available on the eRoom, access to which will be provided to all applicable personnel.
7.3.2.2 Project-specific SOPs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.2.3 SAP Analytical Summaries?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.2.4 Project-specific Electronic Data Deliverables (EDDs)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.2.5 Other (list)? _____		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7.4 TEM Instrumentation				
7.4.1 Does TEM instrumentation meet the following requirements:				
7.4.1.1 Capable of being operated at between 80 and 120 kV?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.4.1.2 Electron diffraction (ED) and energy dispersive X-ray (EDX) capabilities?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.4.1.3 Fluorescent screen with an inscribed or overlaid calibrated scale?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.4.2 Are the instruments equipped with thin film or beryllium windows (list below if necessary)? <u>Beryllium</u>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.4.3 Are all routine and non-routine maintenance activities recorded in instrument-specific logbooks?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Instrument No.	Make	Model	Capabilities	
Scope 3-1	JOEL	100 CX II	LA Spectral Study performed	
Scope 3-2	JOEL	100 CX II	LA Spectral Study not performed	
Additional Comments:				

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7.0 TEM ANALYSIS	Yes	No	Comments
7.5 Instrument Calibration (Laboratory Modification LB-00085A)			
7.5.1 Is microscope alignment performed <u>daily</u> :			
7.5.1.1 Centering of electron beam?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.1.2 Electron beam is properly stigmated on either side of crossover?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.1.3 Image properly focused?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.2 Is the TEM screen magnification calibrated <u>monthly</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.3 Is the camera constant calibrated <u>monthly</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Weekly
7.5.4 Is the spot size diameter determined to be less than 250 nm <u>quarterly</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.5 Is the low beam dose (≥ 15 seconds for Chrysotile) verified <u>quarterly</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.6 EDXA System:			
7.5.6.1 Is X-ray energy versus channel for two peaks (i.e., Cu/Al) checked <u>daily</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.6.2 Is detector resolution (Mn) checked <u>quarterly</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.6.3 Are K-factors relative to Si determined for Na, Mg, Al, Ca, and Fe <u>quarterly</u> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.5.7 Are instrument calibration records maintained in instrument-specific logbooks?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.6 Reference Materials			
7.6.1 Does the laboratory maintain a library of reference materials on asbestos and other fiber types?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.6.2 Are instrument-specific "LA" spectra available, posted near the TEM?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 6 in the Audit Report.
7.7 Grid Acceptance/Rejection Criteria			
7.7.1 Grid preparation rejection criteria:			
7.7.1.1 The replica is too dark due to poor dissolution?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.7.1.2 Replica is doubled or folded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.7.1.3 Replica has $> 25\%$ obscuration rejected?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.7.1.4 Replica has < 50 intact grid openings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<i>Refer to Request for Modifications LB-000016H and LB-000031G</i>			
7.7.2 Are samples associated with grids determined to be overloaded ($>25\%$) re-prepped using the indirect-transfer technique described in SOP EPA-Libby-08?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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7.0 TEM ANALYSIS	Yes	No	Comments
7.8 Modifications to AHERA & ASTM D5755:			
7.8.1 Laboratory Modification LB-000031G:			
7.8.1.1 Are structures classified as fibers (F), bundles (B), clusters (C) or matrices (M)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.2 Are the actual lengths and widths of fibers, bundles, clusters and matrices (M) recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.3 For disperse matrices and clusters, is the length of the longest protruding structure recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.4 Unless identified as a "close call" (LB-000066D), are NAMs not recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.5 Is the designation "ND" used to document when no structures are detected in a grid opening?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.6 Are fibers, bundles, clusters and matrices only recorded they contain individual constituent fibers meeting the aspect ratio criterion?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.7 Are non-countable recorded, but not counted, for informational purposes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.1.8 Is the entire length recorded for structures originating in one grid opening and extending to an adjacent grid opening?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.8.2 Laboratory Modification LB-000067:			
7.8.2.1 Are the structure identification codes described in Tables D.1 and D.2 of ISO Method 10312 used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.9 Modifications to EPA Method 100.2:			
7.9.1 Laboratory Modification LB-000020:			
7.9.1.1 Are all applicable analyte structures, including those comprising the LA complex, $\geq 0.5 \mu$ in length with a \geq AR recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The laboratory is ill-equipped to perform required Ozone/UV light treatment but capable of performing analysis.
7.9.1.2 Are a maximum of 10 grid openings counted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.9.2 Laboratory Modification LB-000067:			
7.9.2.1 Are the structure identification codes described in Tables D.1 and D.2 of ISO Method 10312 used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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7.0 TEM ANALYSIS	Yes	No	Comments
7.10 Modifications to ISO Method 10312:			
7.10.1 Laboratory Modification LB-000016H:			
7.10.1.1 Unless identified as a "close call" (LB-000066D), are NAMs recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.2 Are bundles only recorded if they contain individual constituent fibers meeting the aspect ratio criterion?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.3 Are bundles, compact clusters, and compact matrices counted regardless of aspect ratio?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.4 Are structures that intersect non-countable grid bars recorded for informational purposes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.5 Are component structures, which do not intersect non-countable grid bars, but are within non-countable structures counted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.6 Is the entire length recorded for structures originating in one grid opening and extending to an adjacent grid opening?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.7 For structures which intersect more than one grid bar is the observed length of the structure recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.8 Are the recorded rules for partially obscured structures properly applied (i.e., MFO and MBO)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.10.1.9 Are the counting and recording rules for the identification of PCMe structures at "low magnification" applied?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11 Common TEM Modifications:			
7.11.1 Laboratory Modification LB-000030:			
7.11.1.1 Are highly detailed sketches of up to 50 asbestos structures provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2 Laboratory Modification LB-000066D:			
7.11.2.1 Is the presence or absence of sodium and potassium recorded for all LA, OA and NAM particles (NaK, NaX, XK or XX)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2.2 Is probable mineral identification code recorded for all particles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2.2.1 Are LA particles identified as WRTA, AC, TR or AT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2.2.2 Are OA particles identified as AM, AN or CR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2.2.3 Are NAMs indicated as PY, OT or UN?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2.3 Is one SAED pattern recorded for each amphibole asbestos type encountered per samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.11.2.4 Are EDS spectrum (a maximum of 5) collected for up to 5 LA and 5 Close-call NAM per sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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7.0 TEM ANALYSIS		Yes	No	Comments
7.12 Counting/stopping rules:				
7.12.1 Are the Analytical Summaries reviewed to determine the following:				
7.12.1.1 Analytical Sensitivity?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.12.1.2 Recording rules (i.e., AR)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.12.1.3 Stopping rules (i.e., abundant CH)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.12.1.4 Applicable Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.12.1.5 Investigative or non-investigative?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.13 Quality Control Analyses (Laboratory Modification LB-000029C)				
7.13.1 Are quality control samples analyzed at the required frequencies:				
7.13.1.1 Laboratory blanks – Frequency 4%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Will adopt tracking system used by other EMSL laboratories participating in the Libby project.	
7.13.1.2 Recount Same (RS) - Frequency of 1%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.13.1.3 Recount Different (RD) - Frequency of 2.5%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.13.1.4 Inter-laboratory - Frequency of 0.5%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.13.1.5 Verified Analysis (VA) - Frequency of 1%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.13.1.6 Re-preparations – Frequency of 1%	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
7.13.2 Are samples selected for RS, RD and VA analyses in accordance with Laboratory Modification LB-000029C?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.13.3 Is the procedure used to evaluate QC sample analyses in accordance with Laboratory Modification LB-000029C?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Evaluated in Cinnaminson.
7.14 Standard Operating Procedures (SOPs)				
7.14.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	All SOPs are available on the laboratory network.
Document Title	Control No.	Description		
7.15 Document Control		Yes	No	Comments
7.15.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Document Title	Description/Comments			
Additional Comments:				

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)		Yes	No	Comments
8.1 Are PLM areas adequate, clean, and orderly?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.2 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed				
Name	Title	Experience		
Jessica Cox	PLM Analyst	9 Years		
8.3 Methods and Guidance Documents		Yes	No	Comments
8.3.1 Are the applicable guidance documents available for reference:				
8.3.1.1 EPA SOP SRC-Libby-01?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.1.2 EPA SOP SRC-Libby-03?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.1.3 NIOSH 9002, Issue 2 - Asbestos (Bulk) by PLM?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.1.4 Others (list)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		EPA 600
8.3.2 Are project-specific requirements communicated to laboratory personnel and available for reference:				
8.3.2.1 Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.2.2 Project-specific SOPs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.2.3 SAP Analytical Summaries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.2.4 Project-specific Electronic Data Deliverables (EDDs)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8.3.2.5 Other (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Available on the eRoom, access to which will be provided to all applicable personnel.
8.4 Equipment				
8.4.1 Ventilation Hoods:				
8.4.1.1 Checked routinely and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Checked daily.
8.4.2 Drying oven (optional):				
8.4.2.1 Checked routinely and recorded in a permanent logbook?	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Refer to Finding No. 2 in the Audit Report.
8.4.3 Muffle furnace:				
8.4.3.1 Checked routinely and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Additional Comments:				

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)		Yes	No	Comments
8.4.4 Analytical balances:				
8.4.4.1 Two balances:				
8.4.4.1.1 Accurate to 0.01 g, range of 0.01 to 1000 g?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.4.4.1.2 Accurate to 1 mg?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.4.4.2 Checked routinely and recorded in a permanent logbook?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding No. 7 in the
8.4.4.3 Calibrated within the last 12 months by a certified technician?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Audit Report.
8.5 Stereomicroscope				
8.5.1 Do stereomicroscopes meet the following requirements:				
8.5.1.1 Magnification range of 10X to 50X?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Scopes 1, 2 and 3 are 8X - 35X,
8.5.1.2 Incandescent or fluorescent light source?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	and Scope 4 is 7X - 40X.
8.6 Polarized Light Microscope				
8.6.1 Are PLMs equipped with the following:				
8.6.1.1 Light source and replacement bulbs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.2 Binocular observation tube?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.3 Blue daylight filter?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.4 Oculars (10X)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.5 Objectives: 10X, 20X and 40X (or similar)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.6 10X dispersion staining objective?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.7 A 360 degree graduated rotating stage?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.8 Polarizer and analyzer aligned at 90 degrees to one another?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.9 Bertrand lens?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.10 Substage condenser with iris diaphragm?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.11 Accessory slot for compensator plate?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.12 First order red (550 nanometer) compensator plate?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.13 Crosshair reticle?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.14 Adjustment tools?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.2 Are microscopes well-maintained, and are all routine and non-routine maintenance activities recorded in instrument-specific logbooks?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Instrument No.	Make	Model	Capabilities	
PLM 07	Leica	DM750P		
Additional Comments:				

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.7 Refractive Index Liquids			
8.7.1 What refractive index liquids are available:			
8.7.1.1 High dispersion RI liquids from 1.620 to 1.640?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.7.1.2 1.550 high dispersion RI liquid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.7.1.3 1.680 to 1.700 RI liquids?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.7.2 Are refractive index liquids checked daily for contamination?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.7.3 Are refractive index (RI) liquids calibrated monthly using a refractometer or other means (describe)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8 Reference Materials			
8.8.1 Does the laboratory maintain a library of asbestos and non-asbestos reference materials:			
8.8.1.1 NIST SRM 1866b (Ch, Am and Cr)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.2 NIST SRM 1867a (Tr, Ac, and An)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3 USGS LA PEs:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3.1 LA 0.2% by mass?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3.2 LA 1.0% by mass?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3.3 Other (List)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8.8.1.4 Controlled LA asbestos (USGS)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.5 NIST testing round M12001 (winchite/richterite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.6 Non-asbestos (i.e., gypsum, calcite, and fiberglass)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9 PLM Calibration			
8.9.1 Is PLM alignment performed daily:			
8.9.1.1 Alignment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.2 Stage and objectives centered?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.3 Optic axis centered?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.4 Alignment of the upper/lower polars?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.5 Centered through substage condenser and iris diaphragm?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.2 Microscope adjustments verified and recorded prior to sample analyses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.10 PLM Analysis by NIOSH Method 9002:			
8.10.1 Does the laboratory perform PLM analyses on samples received from the Libby Superfund site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>If answered "No" precede to Section 8.11 of the checklist.</i>			
8.10.2 Are samples visually examined by stereomicroscope for the following:			
8.10.2.1 Color?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.2.2 Homogeneity?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.2.3 Texture?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3 Which of the following techniques are used to prepare samples for analysis:			
8.10.3.1 Mortar & pestle?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.2 Acid washing?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.3 Ashing?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.4 Solvents?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.5 Other (list)?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.4 For non-friable, organically bound samples requiring ashing and/or acid reduction, are all necessary weights and tare weights measured and recorded?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5 Are slides prepared using the appropriate refractive index liquid(s) and scanned for asbestos fibers using the following optical properties:			
8.10.5.1 Morphology?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.2 Color?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.3 Refractive indices?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.4 Pleochroism?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.5 Birefringence?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.6 Extinction characteristics?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.7 Sign of elongation?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.8 Dispersion staining characteristics?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.6 Are the observed optical properties compared to Table 1 (Optical Properties of Asbestos Fibers) to determine the asbestos mineral present?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.7 Is a quantitative assessment of asbestos content made from both the gross and microscopic examinations?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.8 If no fibers are detected in a homogeneous samples are at least two additional slides prepared and analyzed prior to concluding no asbestos is present?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.9 Is at least one optical property recorded for fibers determined to be non-asbestos fibers?	<input type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.11 PLM-VE (SOP SRC-Libby-03)			
8.11.1 Stereomicroscopic Examination:			
8.11.1.1 Are all sample preparation activities performed within a HEPA-filtered hood?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.2 Is the entire sample transferred to an asbestos-free substrate for examination?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A 4" petri dish is used.
8.11.1.3 Is the entire sample examined for homogeneity and the presence of suspect fibers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.4 Are suspect fibers removed with fine forceps and mounted in the appropriate RI liquid for PLM analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.5 Are the stereomicroscopic findings recorded:			
8.11.1.5.1 Sample appearance?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.5.2 Estimated percentage of LA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.5.3 Estimated percentage of other asbestos types?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.2 Determination of Ashing the Sample:			
8.11.2.1 Are soil sample containing a significant amount of artifacts ashed prior to being prepared for random PLM mounts?	NA	NA	None observed to-date.
8.11.2.1.1 Are samples ashed in a muffle furnace at approximately 480°C?	NA	NA	
8.11.2.1.2 Are the necessary gravimetric measurements recorded for the determination of "Pre-ash percent asbestos"?	NA	NA	
8.11.3 Slide Preparation for PLM-VE:			
8.11.3.1 Are a minimum of five random sub-samples mounted in the appropriate RI liquid (1.620-1.640) for measurement of LA optical properties?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.4 Supplemental Stereomicroscopic Evaluation:			
8.11.4.1 Following the random slide mount preparation, is the container agitated to cause the particulate to settle and asbestos fibers sort to the surface?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.4.2 Is the sample re-examined and the fiber pick procedure repeated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.11.5 Classification of Asbestos Mineral Type:			
8.11.5.1 Using PLM is entire area of each prepared slide examined for asbestos, non-asbestos and matrix material?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2 Is positive identification determined from the following six optical properties:			
8.11.5.2.1 Habit?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.2 Color & pleochroism (if present)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.3 Both alpha and gamma Refractive indices?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.4 Birefringence?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.5 Extinction angle?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.6 Sign of elongation (positive-slow or negative fast)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.3 Based on the optical properties, is asbestos classified into one of three categories:			
8.11.5.3.1 Libby Amphibole (LA)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.3.2 Other Amphibole (OA)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.3.3 Chrysotile (CH)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.4 Is at least one optical property recorded for observed non-asbestos fibers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6 Quantification of Asbestos Content:			
8.11.6.1 Is asbestos reported as either mass or area percent for LA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6.2 Are other, non-LA, asbestos types reported in area percent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6.3 Are reference materials used to aid in visual estimation:			
8.11.6.3.1 LA PE reference materials (0.2% or 1.0%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6.3.2 Are visual estimates of greater than 1% LA performed using calibration standards made in-house from NIST SRMs and NIST PEs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.7 Are calibrated visual estimates determined from both the detailed stereomicroscopic observations and examination of the total area for all five random slide mounts?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8 Are LA results reported in the appropriate bin categories:			
8.11.8.1 Non-detects recorded as Bin A?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8.2 Less than 0.2% LA recorded as Bin B1?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8.3 Greater than 0.2%, but less than 1% recorded as Bin B2?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8.4 Equal to or greater than 1% recorded as Bin C, with the percentage recorded as a whole number?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.12 PLM-GRAV (SOP SRC-Libby-01)			
8.12.1 Stereomicroscopic Examination:			See Additional Comments.
8.12.2 Is the entire sample weighed and placed in an appropriate container?	NA	NA	
8.12.3 Does the stereomicroscopic examination include:			
8.12.3.1 Examination of multiple fields of view over the entire sample?	NA	NA	
8.12.3.2 Probing of the sample and breaking clumps where possible?	NA	NA	
8.12.3.3 Manipulation of the sample with the appropriate tools?	NA	NA	
8.12.3.4 Observation homogeneity, texture, friability, color and extent of any asbestos content?	NA	NA	
8.12.4 Does the analyst refrain from segregating and weighing particles smaller than 2 - 3 mm (1/10 inch)?	NA	NA	
8.12.5 If no particles larger than 2 – 3 mm or larger are present, are one of the following recorded:			
8.12.5.1 No asbestos detected (ND)?	NA	NA	
8.12.5.2 Trace levels of asbestos observed, but not quantified (Tr)?	NA	NA	
8.12.6 Examination by PLM:			
8.12.7 Are tentatively identified asbestos particles examined by PLM as described in SOP SRC-Libby-03 (Section 8.12 of this checklist)?	NA	NA	
8.12.8 If asbestos particles are determined to be OA, are they further characterized:			
8.12.8.1 Amosite (AMOS)?	NA	NA	
8.12.8.2 Anthophyllite (ANTH)?	NA	NA	
8.12.8.3 Crocidolite (CROC)?	NA	NA	
8.12.8.4 Unknown (UNK)?	NA	NA	
8.12.9 Is the total weight of each type of positively identified asbestos measured and recorded?	NA	NA	
8.12.10 Record Keeping:			
8.12.11 Is the data log sheet provided in Attachment 1 of the SOP used to record weights the initial (coarse fraction) and segregated asbestos?	NA	NA	
Additional Comments:			
Because the laboratory has yet to receive samples for this analysis, this evaluation was a review of the SOP and necessary equipment, not an actual demonstration of the procedure.			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)		Yes	No	Comments
8.13 Quality Control Analyses				
8.13.1 Are the following types of QC analyses performed at the required frequencies:				
8.13.1.1 Laboratory duplicate self-check (LDS) at a frequency of 2%?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.13.1.2 Laboratory duplicate cross-check (LDC) at a frequency of 8%?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.13.2 For sample containing LA, are LDS and LDC analyses considered acceptable if:				
8.13.2.1 For LA results, within 1 Bin category?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.13.2.2 For LA results, %LA ≤1%?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Note: For LA results greater than 1%, the laboratory should refer to their internal QA/QC system.				
8.13.3 Is the appropriate correction action taken when LDC or LDS analyses do not meet acceptance criteria (describe)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.14 Standard Operating Procedures (SOPs)				
8.14.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Document Title	Control No.	Description		
8.15 Document Control		Yes	No	Comments
8.15.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Document Title	Description/Comments			
Additional Comments:				

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9.0 DATA MANAGEMENT	PCM	TEM	PLM	Comments
9.1 Data Package Review and Assembly	Yes	Yes	Yes	
9.1.1 Are deliverables reviewed to ensure project-specific requirements are adhered to:				
9.1.1.1 Request for Modifications to Laboratory Activities?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.1.1.2 Project-specific SOPs?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.1.1.3 SAP Analytical Summaries?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.1.1.4 Project-specific Electronic Data Deliverables (EDDs)?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.1.1.5 Other (list)? _____	NA	<input type="checkbox"/>	<input type="checkbox"/>	
9.1.2 Are all deliverables reviewed for completeness and accuracy prior to being submitted:				TEM count sheets are scanned and submitted to Cinnaminson for review and EDD generation.
9.1.2.1 Hard copy deliverables?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.1.2.2 Electronic deliverables?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.1.3 Are all reviews documented?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.2 Data Submission				
9.2.1 Is the submittal of electronic deliverables tracked and recorded:				
9.2.1.1 Date submitted?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	E-mailed to ESAT and copies to the FTP site.
9.2.1.2 Recipient?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.2.2 Is the submittal of hard copy deliverables tracked and recorded:				
9.2.2.1 Date submitted?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	E-mailed to ESAT and copies to the FTP site.
9.2.2.2 Recipient?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.3 Data Storage and Archiving				
9.2.3 Are electronic files archived onto suitable media on a frequent basis?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
How often? _____				
9.2.4 Are all hardcopy data stored in a secured location with limited access (e.g., locking file cabinet)?	NA	NA	NA	Stored in Cinnaminson.
Additional Comments:				

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10.0 QUALITY ASSURANCE/QUALITY CONTROL	PCM	TEM	PLM	Comments
10.1 Laboratory Certifications	Yes	Yes	Yes	
10.1.1 Is the laboratory accredited for asbestos analysis under the National Voluntary Laboratory Accreditation Program (NVLAP):				
10.1.1.1 Asbestos Fiber Analysis (TEM Method)?	NA	<input checked="" type="checkbox"/>	NA	
10.1.1.2 Asbestos Fiber Analysis (PLM Method)?	NA	NA	<input checked="" type="checkbox"/>	
10.1.2 Is the laboratory accredited for asbestos analysis under the American Industrial Hygiene Association (AIHA), and does it participate in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program?	<input checked="" type="checkbox"/>	NA	NA	
10.2 Training				
10.2.1 Have all analysts undergone training on the proper usage of the equipment and instrumentation used in the respective areas?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.2.2 Have all analysts demonstrated proficiency through the preparation and/or analysis of standards or samples of known values?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.2.3 Are training records maintained in analyst-specific files?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.3 Internal Audits				
10.3.1 Are internal audits conducted on an annual basis using an appropriate checklist?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.3.1.1 Are internal audit reports available for review?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.4 Corrective/Preventive Action:				
10.4.1 Can the laboratory demonstrate the sequence of problem identification, corrective action, and resumption of duties?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.5 Quality Records				
10.5.1 Are SOPs available in the applicable areas for all laboratory-specific procedures?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Network (eLink)
10.5.2 Does the laboratory have a Quality Assurance Manual/Plan?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.5.3 Does the laboratory compile monthly quality assurance/quality control reports?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6 Environmental Controls/Laboratory Monitoring				
10.6.1 Does the laboratory conduct an environmental monitoring program?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6.2 Is quarterly air monitoring performed in all laboratory areas?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6.2.1 Are the collected samples analyzed by TEM with a target analytical sensitivity of 0.005 structures/cc?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6.2.2 If LA is detected, are the affected areas thoroughly cleaned and a new set of samples collected and analyzed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Laboratory Modification LB-000085A</i>				
Additional Comments:				